

João M. Rocha<sup>1,2</sup>, Ana M. M. Sousa<sup>2</sup>, Joana Santos<sup>3</sup>, Rita Alves<sup>3</sup>, Raquel Gonçalves<sup>2</sup>, M. Beatriz Oliveira<sup>3</sup>, M. Pilar Gonçalves<sup>2</sup>, Cristina M. R. Rocha<sup>2,4</sup>

<sup>1</sup> Centre of Molecular and Environmental Biology (CBMA), University of Minho, Campus de Gualtar, Braga, Portugal

<sup>2</sup> REQUIMTE, LAQV, Department of Chemical Engineering, Faculty of Engineering, University of Porto, Porto, Portugal

<sup>3</sup> REQUIMTE, LAQV, Department of Chemical Sciences, Faculty of Pharmacy, Universidade do Porto, Porto, Portugal

<sup>4</sup> Present address: Centre of Biological Engineering (CEB), University of Minho, Campus de Gualtar, Braga, Portugal

Agar is a biopolymer extensively used as gel and stabilizer. Depending on red seaweeds and agar extraction protocols, different physicochemical properties are attained. This research aimed at a better understanding the agar's physicochemical properties effect on agar coatings performance to improve shelf-life of fresh fruits. Agar was extracted from red algae *Gracilaria vermiculophylla* in presence or absence of a pre-treatment with aqueous sodium hydroxide prior to extraction and purification. Agar extracts were characterized regarding molecular weight (Mw), sulphates, 3,6-anidrogallactoses (LA), gelation and melting point, extraction yield, gel strength, microstructure (via cryo-SEM) and water content. Distinct agar-based coating and film formulations were prepared resorting to native and low sulphate and high anidrogallactose content-commercial agars. Glycerol and tween-80 were used as plasticizer and surfactant, respectively. Agar-based coatings were employed in fresh strawberries, which were further packed and stored at 10°C, 80%RH and 25%van during 7-d, and shelf-life evaluated via several physicochemical, mechanical and nutritional parameters. Significant differences were observed in some properties, e.g. LA, sulphates, Mw, gel strength and microstructure – particularly in comparison to commercial agar. Coating data showed minor differences between native agar extracts and formulations but significant variations with commercial ones. Nevertheless, shelf-life improvement was apparent in coated fruits when analysing colour and phenolics. Commercial agar led to slightly stronger films but native agar produced appropriated ones. This study confirms high correlations between extraction procedure and some properties of final agar which, in turn, have some key effects when used as edible coatings and films. Finally, potential use of *G. vermiculophylla* agar in coatings and films was established, contributing to the valorisation of environmental by-products.

*Keywords: Agar-based films and coatings, Gracilaria vermiculophylla, shelf-life of fresh fruit, physicochemical and mechanical properties*



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**XIX NATIONAL CONGRESS  
OF BIOCHEMISTRY**

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**SPB2016**

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## **SPB2016 Book of Abstracts**

Published by

**SPB – Sociedade Portuguesa de Bioquímica**  
Universidade de Coimbra  
Departamento de Bioquímica  
Apartado 3126  
3001 - 401 Coimbra, Portugal

**CBMA – Centro de Biologia Molecular e Ambiental**  
Universidade do Minho  
Departamento de Biologia  
Campus de Gualtar  
4710 - 057 Braga, Portugal

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**Editor:** Miguel Pinheiro  
**Proofreader:** Lina Kakoulidou  
**Editing Services:** SY4SCI Events, Lda.  
**Production Services:** Copissaurio, Lda.

**Interior Designer:** Miguel Pinheiro  
**Cover Designer:** Tomás Capa  
**Illustrator:** Tomás Capa

**November 2016: First edition (Print)**  
**December 2016: Second edition (Web)**

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